
Status & Remarks

The application presently contains the following claims:

<i>Independent Claim #</i>	<i>Dependent Claim #s</i>
1	2-7
8	9-17
18	19-27

Claims 1-27 are amended in this response.

Support for the amendment limitation clarifying that the process includes emitting the media from a nozzle of the air jet at a low pressure wherein the low pressure is insufficient for the media to damage the substrate surface but the low pressure is sufficient for the media to remove the thermal barrier ceramic coating may be found with reference to Abstract of the application as originally filed and as amended, as well as Page 1, Para. 0007 of Publication No. US 2005/0126001 A1, the publication of the application at issue, Page 2, Para. 0014 and other locations throughout the specification of the application at issue.

In the Specification

The examiner has objected to the abstract of the disclosure and has stated that "Briefly, the present invention provides" should be omitted from the abstract.

In an effort to remove the objection to the abstract of the disclosure, please replace the abstract of the disclosure with the following amended paragraph:

~~Briefly, the present invention provides a~~ A process which uses an air jet containing non-abrasive particulate media at a low pressure which selectively removes thermal barrier coatings from components without damaging the metallic substrate. This process selectively removes thermal barrier coatings from the cooling holes of components.

The applicant's attorney believes the above amended paragraph meets the requirements of MPEP §608.01 and requests the examiner revisit the objection to the abstract of the disclosure in light of the amendments made above.

Claim Objections

The examiner has objected to Claims 2-7, 9-17 and 19-27 because "Process" should be replaced with "The process" in line 1 of each of the aforementioned claims.

In effort to remove the objection to the claims the required amendments have been made to the claims. The applicant's attorney requests the examiner revisit the objection to the claims in light of the amendments made above.

35 U.S.C. §103

The examiner has rejected Claims 1-13, 17-23 and 27 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,210,488 ("Bruce") in view of U.S. Patent 4,020,535 ("Cuneo"). The examiner has further rejected Claims 14-16 and 24-26 as being unpatentable over Bruce/Cuneo, and further in view of U.S. Patent 6,663,919 ("Farmer" or " '919 Patent"). The applicant's attorney would respectfully request that the examiner revisit the rejection in view of the following arguments as associated with the amended pending claims.

The examiner has represented that Bruce teaches a process for removing a thermal barrier ceramic coating from a cooling hole of a metallic turbine engine component using glass bead peening. The examiner has also represented that Cuneo teaches using an air blast of glass beads at a pressure of 20 to about 100 psi to remove a coating from a substrate and that Farmer teaches directing the jet at an angle to its intended target.

As the examiner is familiar with, most inventions arise from a combination of elements and each element may often be found separately in the prior art.¹ However, mere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole. More specifically, an examiner must articulate the basis on which he or she concludes that it would have been obvious to make the claimed invention and explain the reasons one of ordinary skill in the art would have been motivated to select the references, or teachings contained therein and to combine them to render the invention obvious. This "motivation-suggestion-teaching" requirement protects against the entry of

¹ *In re Leonard R. Kahn*, 441 F.3d 977, 987, (Fed. Cir. 2006), citing *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) (hereinafter "*Kahn*").

hindsight into the obviousness analysis, a problem which §103 was meant to confront² Therefore, the "motivation-suggestion-teaching" test asks not merely what the references disclose, but whether a person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventor, would have been led to make the combination recited in the claims³

Additionally, an obviousness determination requires not only the existence of a motivation to combine elements from different prior art references, but also that a skilled artisan would have perceived a reasonable expectation of success in making the invention via that combination.⁴ However, to have a reasonable expectation of success, one must be motivated to do more than merely "vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful."⁵ Similarly, prior art fails to provide the requisite "reasonable expectation" of success where it teaches merely to pursue a "general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it"⁶

Applying the mandates of the U.S. Court of Appeals for the Federal Circuit, it is clear that the combination of Bruce and Cuneo merely provided a starting point for experimentation, and that only by trial and error, would perhaps, a serendipitous result be arrived at by the experimentalist as taught by the current invention as claimed in the pending application. Neither Bruce nor Cuneo teaches or suggests how to combine the use of particulate media with low pressure air to arrive at the present application as claimed, wherein the particulate media becomes a non-abrasive process that does not damage the underlying substrate. To imply otherwise would be to employ impermissible hindsight. Stated differently, it is unclear what suggestion an experimentalist would be following to arrive at the claimed subject matter as stated by the examiner. "

Moreover, Bruce not only lacks the motivation, suggestion or teaching of the combination of elements of the currently claimed invention, but, in fact, teaches away from the method of the claimed invention. More specifically, Bruce references the use of particulate matter, such as grit blasting or glass

² *Kahn* at 986.

³ *Kahn* at 988, citing *Cross Med. Prods.*, 424 F.3d 1293, 1321-24 (Fed. Cir. 2005).

⁴ *Medichem, S.A. v. Rolabo, S.L.* 437 F.3d 1157, 1165 (Fed. Cir. 2006), citing *In re O'Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988).

⁵ *Medichem* at 1165; *O'Farrell* at 903.

⁶ *Id.*

bead peening as an abrasive, as opposed to non-abrasive, method of removing for the removal of a thermal barrier ceramic coating from a cooling hole of a turbine engine, and recognized that the same "is a slow, labor-intensive process that erodes the ceramic layer and bond coat, as well as the substrate surface beneath the coating. Bruce seems to acknowledge that "with repetitive use, these removal processes eventually destroy the component by reducing the wall thickness of the component" [Col. 1, Line 63 through Col. 2, Line 1]. Bruce states "significant effort has been directed to developing nonabrasive processes for removing ceramic coatings" such as autoclaving processes. Bruce then moves drastically away from the use of particulate media, and teaches the use of a liquid bath combined with ultrasonic energy to remove the ceramic layer. Bruce makes no mention of particulate media used as a nonabrasive process for removing ceramic coatings.

Cuneo also teaches an abrasive, as opposed to nonabrasive, method of using glass beads to purposely cut into the graphite of the substrate face. More specifically, Cuneo teaches that "the substrate blank with the developed pattern of protective material is then struck with a plurality of particles having a dimensional size and velocity to erode away a predetermined depth of the graphite substrate in the exposed pattern." [Column 4, Lines 19-23 (emphasis added)] Cuneo further teaches that "the entire surface of the substrate blank will be sprayed with the glass beads...circuit grooves correspond to roughly 15 mils in depth are created by the impact of the glass beads particles on the exposed graphite substrate." [Column 4, Lines 49-54]

Farmer teaches of directing a jet at substantially the same angle as the cooling hole, however teaches of using a liquid stream from the jet. [Column 5, Lines 62-64].

Consequently, the prior art identified by the examiner teaches an abrasive, as opposed to nonabrasive, method of removing coatings that does in fact damage the substrate. However, the process of the present invention uses "non-abrasive particulate media which is effective for the removal of thermal barrier coating deposits and does not result in wear erosion of the underlying metal substrate due to the low pressure process air and the inherent characteristics of the non-abrasive media that is used. The present process can be used an unlimited number of times on a component without significant wear and erosion." [Page 1, Para. 009 of Publication 2005/0126001 A1, the Publication of the Application at hand (emphasis added)]. The non-abrasive particulate media is preferably a dry spherical bead medium, and may be, but is not necessarily, glass beads, [Page 1, Para. 0010 and Page 2, Para. 0014]

Notwithstanding the foregoing, independent claims 1, 8 and 18 have been amended to clarify the foregoing and Applicant's attorney believes the amended claims clearly define over the prior art and that all claims are in position for allowance

Request for Reconsideration

Applicant believes that all independent claims clearly define over the prior art and that the distinctions between the present invention and the prior art would not have been obvious to one of ordinary skill in the art. Additionally, the remaining dependent claims, by the limitations contained in the base independent claims, are believed to be patentable over the prior art by virtue of their dependency from independent claims which distinguish over the prior art of record. All pending claims are thought to be allowable and reconsideration by the Examiner is respectfully requested.

A fee determination sheet is attached for this amendment response. The Commissioner is hereby authorized to charge any additional fee required to effect the filing of this document to Account No. 50-0983. Specifically, the USPTO is authorized to charge for one additional independent claim.

If the examiner believes that a telephonic conversation would facilitate a resolution of any and/or all of the outstanding issues pending in this application, then such a call is cordially invited at the convenience of the examiner.

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Respectfully Submitted,
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